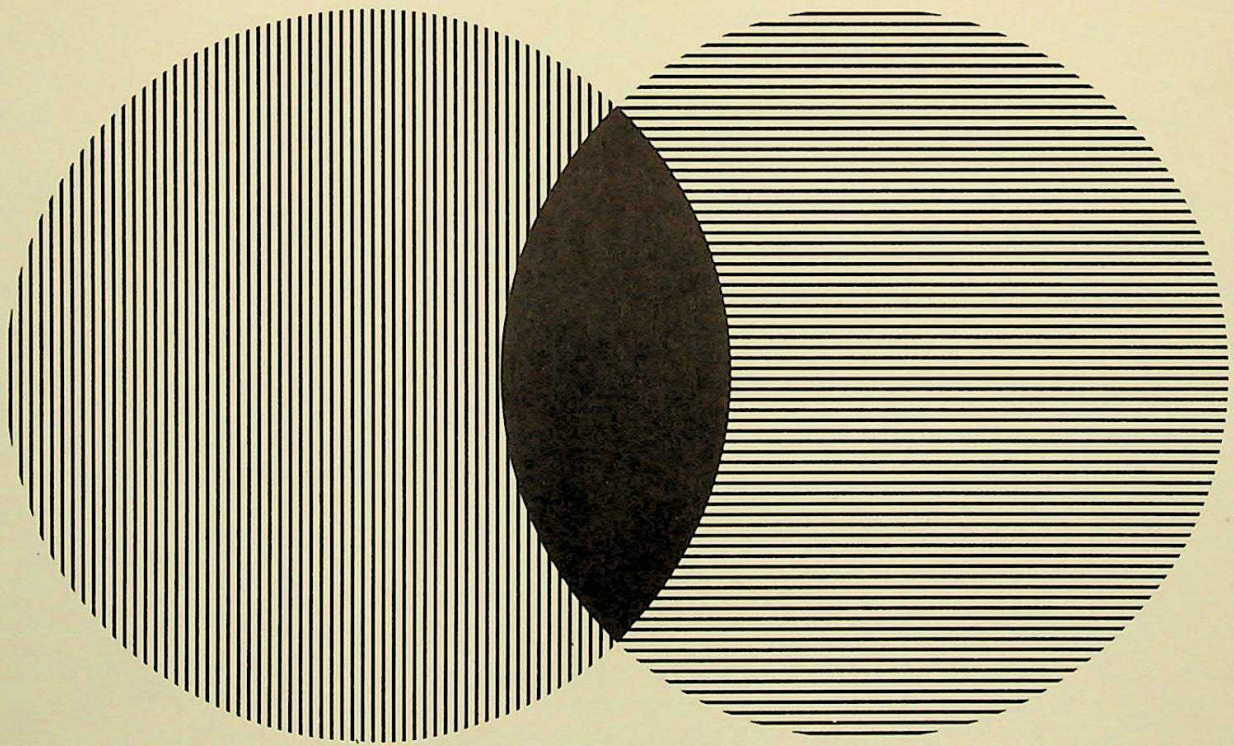
How to Make Polaroid Vectograph Prints



Preface

Although this process manual was prepared for those who are either working in the photographic field or have working experience with conventional photographic processes, anyone having direct or indirect access to standard photographic supplies and equipment should be able to make satisfactory Polaroid Vectograph prints using it.

Since the instructions may not be optimum for all conceivable applications of Polaroid Vectograph film, some may wish to modify processing solutions, techniques, and equipment to suit their particular requirements. These changes are left to the discretion and experience of the individual.

Contents

I. Principle of Polaroid Vectograph Prints

A Polaroid Vectograph print is a graphic medium based on the polarization of light.

Ordinary (unpolarized) light is made up of rays vibrating equally in all directions crosswise to their direction of travel. In the terms of vector geometry, these may be represented more simply as a pair of equal components vibrating at right angles to one another.

Light becomes **polarized** when one component is partially or wholly removed, so that the two components are no longer equal. This may be accomplished in a number of ways. One method is to pass it through a layer of oriented molecules which can absorb one component but not the other. This is the principle used in Polaroid sheet polarizers and in Polaroid Vectograph prints.

In a sheet polarizer, the direction in which polarized light is transmitted is called its **transmission axis** or **polarization axis.** If two polarizers are superposed with their polarization axes parallel, both will transmit the same component and the pair will appear transparent. If they are superposed with their axes at right angles — i.e., crossed with one another — the component transmitted by each will be absorbed by the other and no light will get through.

In a Vectograph print, the image itself is a polarizer. Like other sheet polarizers it freely transmits one component of ordinary light. However, while the ordinary sheet polarizer absorbs virtually all of the other component, a Vectograph image absorbs this component in proportion to its density. Nearly all of this component will be absorbed in high density areas and only a small amount will be absorbed in low density areas.

Viewed through a polarizer with its polarization axis parallel, the Vectograph image is invisible. Through a polarizer with its axis of polarization at 90°, the image is seen in full contrast.

If two Vectograph images are superposed with their axes at 90° to one another, they may be viewed independently by looking through another polarizer. When this viewing polarizer (also called an analyzer) has its polarization axis parallel to that of one image, that image is invisible and the other is seen in full contrast as above. If the viewing polarizer is rotated 90°, the first image will be seen in full contrast and the second will disappear. Each image of such a pair is complete and continuous and is not changed or suppressed by the presence of the other image.

Polaroid Vectograph film is a double-surfaced material, with each surface a transparent layer of oriented molecules. The orientation axes of the two surfaces are at 90° to one another. Polarizing images are formed on these two surfaces by the imbibition of a solution of light-absorbing molecules which have the ability to align themselves parallel to the oriented molecules.

For some purposes, different pictures can be printed on opposite sides of the Vectograph film and each viewed individually. These are sometimes called **contrast** or **comparison** Vectograph prints.

In three-dimensional (3-D) Vectograph prints the two images representing a stereoscopic pair are printed in stereoscopic register on opposite surfaces of a sheet of Vectograph film. The observer wears a viewer with polarizing left- and right-eye filters, with their polarization axes at 90° to one another and each at 90° to the corresponding Vectograph image. Each eye then sees only the image intended for it, and the pair of images appears as a single, three-dimensional picture.

This manual specifically covers procedures for preparation of three-dimensional Vectograph prints, starting with conventional stereoscopic negative pairs. The process information will, of course, apply equally well to contrast Vectograph prints. For those applications where printing of the Vectograph image is accomplished by means other than matrix film, the finishing instructions for the Vectograph print still apply.

II. Introduction to The Polaroid 3-D Vectograph Process

The Vectograph image is formed by a printing process. A master film called the matrix is inked with Vectograph printing solution, which is taken up in proportion to the density of the image. When the inked matrix is pressed against a sheet of Vectograph film, the printing solution is completely transferred. The final image represents the range of densities in the original subject in terms of concentration of printing solution.

Matrices for forming Vectograph prints are made on Eastman Kodak Matrix Film. They are prepared by printing from the original stereoscopic negatives and developing in a special developer which hardens only the exposed portion of the emulsion. The unexposed portion remains soft and is readily washed away by warm water. The resulting matrices bear positive images in relief in gelatin. Areas which were dark in the original negatives are reproduced as thin areas on the matrix; areas which were light in the negatives are reproduced as thick areas on the matrix.

The matrices, after being accurately registered stereoscopically and bound together with a hinge of waterproof tape, are soaked in Vectograph printing solution. The gelatin images absorb this solution in proportion to gelatin thickness.

The printing step in the process, which transfers Vectograph printing solution from the gelatin matrices to the surfaces of the Vectograph film, is accomplished by placing a sheet of Vectograph film between the matrices and passing the resulting "sandwich" through a pair of pressure rolls. Printing solution transfers to the Vectograph film surface, producing a polarizing image with density in direct proportion to the matrix gelatin thickness. When the "sandwich" is taken apart, the 3-D Vectograph print is ready for viewing.

Polaroid 3-D Vectograph prints may be viewed directly as reflection prints or transparencies. Transparencies may also be mounted as slides and projected in standard projectors. With the Vectograph process it is possible to present three-dimensional pictures in physical forms similar to those of conventional two-dimensional pictures with comparable convenience and simplicity.

III. Equipment & Materials

Most darkrooms equipped for conventional photographic work will already have much of the equipment listed below, but, for convenience in checking, the list includes almost everything which may be required.

Equipment for making 8″ x 10″ prints will be specified. If work of a different size is planned, appropriate substitutions should be made.

Equipment

Enlarger or Contact Printer
Tray Rocker (optional)
Trimming Board
Light Box with diffuse light source
Wringer with smooth rubber rolls
Darkroom Timer, 5-minute range
Kodak Series 1 Safelights
Photo Clips
6 Photo Trays for 8″ x 10″ film
2-3 One-gallon Tanks for 8″ x 10″ film
2 Tank Rods

Note: Household hand or electric wringer (available at Sears Roebuck stores) can be used. Rolls must be ground smooth if they come with crepe surface.

(12″ deep, 2″ x 10″ cross-section. Enamel on steel available from Bettinger Co., Milford, Mass. or Type 316 stainless steel, 26 gauge.)

(Type 316 stainless steel, 3/16″ diameter, bent to fit tank top.)

3-4 Sheets Plate Glass, 10″ x 12″ or larger
1 Kodak Rubber Squeegee
1 Funnel — Kodak Combination Funnel or 4-5″ plastic or glass funnel
1-2 Kodak Camel's-Hair Brushes (for lacquering and aluminizing)
1 Dusting Brush — 3″ Static-Master or Kodak 2″ Camel's-Hair Brush
1 100 ml. Graduated Cylinder
1 500 ml. Graduated Cylinder
Small Laboratory Balance
Polaroid Stereo Viewers — Model #729 (all plastic) or Model #717 (plastic frame, glass filters)
1 Kodak Projection Print Scale

Materials

Kodak Matrix Film (Type 5510)	Select size at least 2″ longer and wider than finished Vectograph print dimensions.
Polaroid Vectograph Film R-1	
Hinge Tape	Scotch Brand Pressure Sensitive Tape No. 310, 1¼″ wide.
Hinge Fillers	Micarta, linen-filled, 8″ x ⅜″ x .024″ +/–.002″

Photographic Masking Tape, 1″ wide, 3M #235
Filter Paper, fine grade (such as Whatman #40) or fine, lintless filter cloth
Clean, soft, lintless wiping cloths
Cover glasses for slides
Slide-binding tape
Kodak Tanning Developer A
Kodak Tanning Developer B
Acetic Acid (Glacial or 28%), Photographic Grade or USP
Ammonium Thiocyanate, USP
Potassium Iodide, USP Granular or Fine Cryst
Polaroid Vectograph Ink (AB)
Polaroid Vectograph Fix Bath B-248
Polaroid Vectograph Lacquer 676
Polaroid Vectograph Lacquer Thinner 664
Polaroid Vectograph Aluminum Pigment 689 (for reflection Vectograph prints only)

IV. Preparation of Matrices

The materials and procedure for making matrices are presented first in outline form (Section A), then in detail (Section B). An extra copy of the outline is included on page 11, so that it may be posted in the darkroom for convenient reference.

A. Matrix Preparation Outline

1. Processing Solutions

(quantities suitable for tray development of 8″ x 10″ film)

Developer B-305	
Water	100 ml.
Kodak Tanning Developer B	100 ml.
Kodak Tanning Developer A	100 ml.
Stop Bath B-304	
Water	495 ml.
Acetic Acid, Glacial	5 ml.
or	
Acetic Acid, 28%	18 ml.
Water	480 ml.
Fix Bath B-233	
Water	500 ml.
Ammonium Thiocyanate	100 g.
Bleach B-245	
Water	400 ml.
Potassium Iodide	140 g.
Polaroid Vectograph Ink (AB)	100 ml.

2. Procedure

a. Expose

b. Process

Step	Solution	Temp. (°F)	Time
1. Presoak	Water	68°	1 min.
2. Develop	Developer B-305	68°	3 min.
3. Stop Development	Stop Bath B-304	68°	2 min.
4. Fix	Fix Bath B-233	68°	2 min.
5. Wash Off	Water (several changes)	110°	2 min.
6. Bleach	Bleach B-245	68°	2 min.
7. Rinse	Water (several changes)	68°	1 min.
8. Dry		Room Temp.	

c. Register stereoscopically and hinge.

B. Matrix Preparation in Detail

1. Preparation of Solutions

a. **The developer** used is mixed from two stock solutions, Kodak Tanning Developer A and Kodak Tanning Developer B, and water. The solution of Kodak Tanning Developer B is stable; it may be prepared in advance and stored for several days. The solution of Kodak Tanning Developer A will not keep and must be prepared on the day it is used. Developer B-305 must be mixed just before it is used. It may not be stored or re-used.

b. **All other solutions** (Stop Bath, Fix Bath and Bleach) may be prepared and poured into trays in advance. These solutions may be stored and re-used. The quantities of each listed will process up to 50 8″ x 10″ sheets of matrix film.

c. **In preparing Fix Bath B-233** for immediate use, it is advisable to start with water at 100°F. The temperature will drop to about 68°F as the ammonium thiocyanate dissolves.

d. **Temperatures of processing solutions must be controlled** within one degree Fahrenheit to obtain reproducible results. However, the working temperature may be selected anywhere within the range 68–73°F; it should be close enough to room temperature that it is easy to maintain.

If developing temperature is above 68°, reduce developing time by 10 seconds for each degree above 68°. Other processing times need not be adjusted.

2. Exposure

a. Setup for exposing matrices

(1) **Kodak Matrix Film** is blue-sensitive and can be handled under Wratten Series 1 Safelights (red). With care to avoid prolonged handling, Series OA Safelights may be used. (Kodak Pan Matrix Film, which must be handled in total dark, is not recommended for printing of Vectograph prints.)

(2) **Matrix film is always exposed through its base** (with shiny surface toward the negative.) It is necessary that the exposed portion be next to the support so that it will not be washed away with the unexposed portion. See Figure 1.

(3) **If the matrices are to be printed by contact,** sharpest images will be obtained by using a small light source at some distance from the film. An enlarger with its lens stopped down may be used as such a light source. Negatives and matrix are then placed in contact on the easel under a sheet of plate glass.

(4) **Negative or matrix film should be masked to provide an unexposed border** of at least 1¼″ on the side of the matrix to be hinged and at least ½″ on the other three sides.

(5) **Printed dirt spots are particularly disturbing** in three-dimensional pictures, as they will be seen by one eye and not by the other. All precautions should be taken to have everything dust-free when exposing matrices. Brushing both negative and matrix film with a Static-Master brush is helpful; and, of course, work area should be kept as clean as possible.

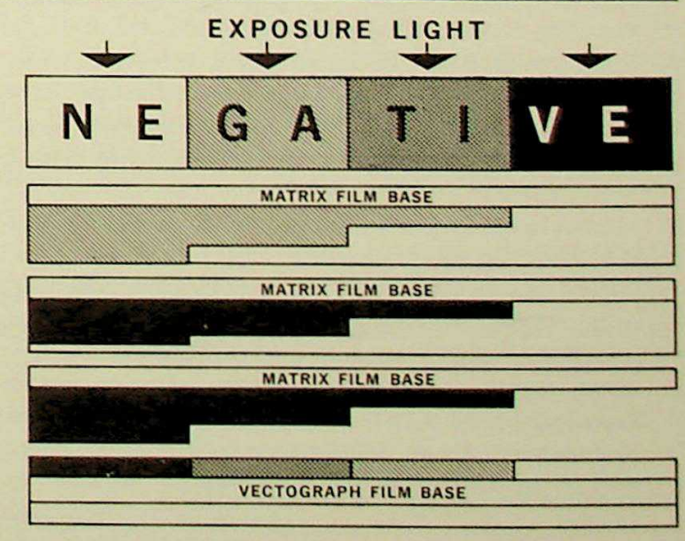
(6) **Use matrix film of a single production lot** for all exposure test matrices and printing matrices of a set, to avoid variation in density. (Lot number is the second of three numbers printed on the side of each box of Kodak matrix film.)

(7) **Identify all left- and right-eye matrices** at time of exposure to avoid confusion later on. A convenient method is to clip one corner to identify one eye, two corners to identify the other.

b. Exposing left- and right-eye matrices

(1) **It is important to identify left- and right-eye negatives** carefully before exposing matrices. To determine left-right identification, superpose the pair with the left-right, up-down arrangement planned for the final print. Locate point corresponding to the **nearest** object in the picture and register this point exactly. Now, examine points corresponding to more distant objects. These will be separated in proportion to their distance, and the negative in which they lie to the left is the left-eye one — the other is the right-eye negative.

Figure 1



EXPOSURE: Varying amounts of light transmitted through the light and dark areas of a stereo negative create latent image of varying depth in matrix film emulsion.

DEVELOPMENT: Where latent image is developed the surrounding gelatin of emulsion is hardened by tanning developer.

WASH-OFF: Unhardened gelatin washes off, leaving relief image which soaks up varying quantities of printing solution.

FORMING VECTOGRAPH PRINT: Varying densities of Vectograph image formed by solution transferred from matrix image. Similar image formed on other side of Vectograph film.

(2) **It is necessary to expose matrices with correct left-right orientation** to correspond with the standard orientation of Polaroid Vectograph film and stereo viewers.

In order to print paired images on opposite surfaces of the Vectograph film, the left and right matrices are to be hinged together emulsion-to-emulsion. In most cases, this will require printing through the base of at least one of the negatives — i.e., matrix film and negative facing base-to-base. Exact printing arrangement depends on picture format.

(3) **To determine printing position of the negatives,** superpose them with the left-right, up-down arrangement planned for the final Vectograph print and with left-eye negative toward you if for vertical format, right-eye negative toward you if for horizontal format. For each negative, the surface now inside this "sandwich" is the surface to place toward the matrix film when exposing it. This is true for both contact printing and enlarging.

c. Matrix exposure tests

Usually a test with one negative of stereo pair is sufficient. However, if the two negatives do not appear identical in density, make a test with each.

(1) **Select for exposure test an important area of picture,** preferably one which includes some of the lightest highlights. Exposure tests need not include the whole picture; a 4″ x 5″ area is usually adequate. An 8″ x 10″ sheet of matrix film may be cut into four such pieces.

(2) **Make exposure test through Kodak Projection Print Scale** (or make similar series of graded exposures with step-wedge or by masking and exposing consecutive strips.) Place scale directly on top of matrix film if printing by projection, against negative (side away from matrix film) if contact-printing; expose for 1 minute.

(3) **Process test matrix or matrices,** following procedure outlined in Section A through Step 7 (Rinse).

(4) **Inspect test matrix.** Correctly exposed segment of test chart should appear transparent in brightest highlights, pale yellow-tan in highest densities. If all areas appear very light, repeat test with more exposure; if all areas are deep tan, reduce exposure and repeat.

(5) **Print one-sided test Vectograph print.** Place wet matrix in Vectograph printing solution, medium strength, supporting with photo clip or film hanger. Follow Vectograph printing procedure, as outlined in Section V A, Step 1 through Step 4 (Squeegee and wipe).

(6) **Inspect test Vectograph print** by viewing through crossed polarizer or corresponding filter of stereo viewer. If for transparency, inspect on light box; if for reflection print, hold tightly against an aluminum surface (such as back of finished reflection Vectograph print) to view.

(7) **Select matrix exposure** which gives most satisfactory Vectograph print density range. If one minute exposure was used with Kodak Projection Print Scale, circled numbers in segments indicate corresponding exposure in seconds.

3. Processing Procedure

a. The process recommended here differs in several steps from the Kodak procedure for dye transfer matrices, but the handling is essentially similar.

b. It is important to avoid particles of dirt in matrix-processing solutions and rinses. Cleanliness of the water supply may be checked by tying a filter cloth over the water outlet and letting the water run for a time. If particles of dirt are present, either continue to use filter cloth or, preferably, install filters with renewable cartridges in the supply line.

c. All solutions are specified in quantities suitable for handling one or a few 8″ x 10″ sheets at a time in trays. For tray processing, agitation may either be by hand tray-tilting or interleafing or by an automatic tray-rocker. If processing is to be done on a large scale, the use of 3½ gallon tanks, 8″ x 10″ film hangers, and nitrogen-burst or other mechanical agitation is in order.

d. Processing steps:

(1) **Presoak** (Water, 68°)
Soak matrices with emulsion surface up for 1 minute, agitating constantly. If two or more matrices are to be processed together, they should be interleafed by repeatedly withdrawing the bottom one and placing it on top. The first one in should also be the first one out, to keep treatment equal.

(2) **Develop** (Developer B-305, 68°)
Transfer matrices one-at-a-time from presoak to freshly mixed developer. Agitate continuously for 3 minutes.

(3) **Stop Development** (Stop Bath B-304, 68°)
Transfer matrices one-at-a-time to stop bath, agitating for at least 30 seconds. Lights may be turned on at this time.
It is possible to leave one or more matrices in the stop bath so that they may be processed one-at-a-time through the remaining steps.

(4) **Fix** (Fix Bath B-233, 68°)
Transfer matrix, emulsion surface up, to fix bath; treat for 2 minutes, agitating constantly. This solution will make the unhardened gelatin very soft, and some of it may loosen and come off in the fix bath.

(5) **Wash Off** (Water, 110°)
Transfer matrix, emulsion surface up, to tray of warm water, agitate well and pour off water. Repeat several times, using fresh 110° water. After first minute, lift matrix and wipe edges carefully with fingers to remove loose particles of gelatin.
Unhardened portions of matrix gelatin will wash away during these rinses. Continue for 2 minutes or until matrix is completely free of loose fragments.

(6) **Bleach** (Bleach B-245, 68°)
Transfer matrix, emulsion surface up, to tray of bleach; agitate continuously for 2 minutes or until dark silver has disappeared, leaving tan image.

(7) Rinse (Water, 68°)

Transfer matrix from bleach to tray of clean water. Pour off and refill with clean 68° water several times, rinsing for at least 1 minute. If one matrix of a set is being processed while second one is left in stop bath, the first may now be held in final rinse while others are processed.

(8) Dry matrices. Hang each matrix by an edge, holding with two photo clips or other hanger, using same edge of picture for both matrices of a stereo pair. Water droplets may be wiped from back, but gelatin surface should not be touched.

For maximum dimensional stability, dryers with high or variable temperatures or air currents must be avoided.

4. Registration and Mounting

a. Register matrices stereoscopically.

(1) Lay matrix pair, emulsion-to-emulsion, on light box, with left-right, up-down arrangement planned for final Vectograph print. Tape lower matrix lightly to top of light box with masking tape.

(2) Select in the picture the point to be registered and superpose this point in the two matrices. See figure 2.

If the point chosen is the nearest, when viewed stereoscopically it will appear to lie at the surface of the picture (or screen, if projected), and all other parts will appear farther away.

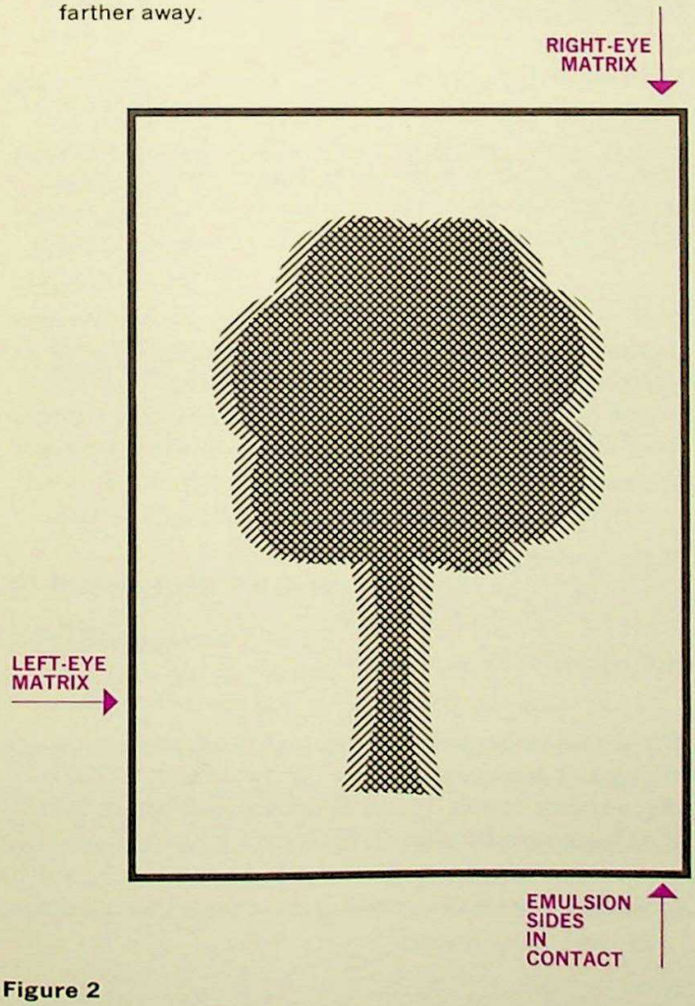


Figure 2

If a point which is not the nearest is superposed, all objects which are closer will appear in front of the picture or screen surface. In general, for best results with this stereo effect, only objects which are not near or cut off by the sides of the picture should appear in front.

To register the images so that all points, including the nearest, will appear behind the plane of the print or screen, superpose the nearest point and then slide the right-eye matrix horizontally to the right (or left-eye matrix toward left) ⅛″ or more. The greater this separation, the farther back the picture will appear to be.

In general, the maximum separation should not exceed ⅜″ for small pictures and ¾″ for large ones.

(3) Examine pairs of points representing objects at distances other than that of the superposed point. They will now be displaced from one another horizontally, due to the parallax between left and right picture-taking positions. They must not, however, be displaced vertically and they must not be rotated with respect to one another. Adjust position of top matrix carefully until all displacements appear horizontal and as parallel as possible, taking care not to change registration of superposed point.

(4) When the matrices have been correctly registered, attach upper matrix to lower one with masking tape on the long edges to preserve registration temporarily and carefully remove the pair from the light box.

b. Trim matrix pair

Matrices are hinged by one of the shorter edges, which will, of course, be top or bottom of a vertical picture and left or right side of a horizontal picture.

Lay the taped matrix pair on trimming board and trim the edge to be hinged. Take care to make this cut parallel to horizontal or vertical direction in the picture.

c. Attach hinge

(1) Cut a strip of Vectograph hinge tape 1″ longer than edge of matrix pair to be hinged. Lay tape, adhesive side up, on flat surface, and to this attach a hinge filler of the same length, aligning one edge of filler with one edge of tape.

(2) Butt the trimmed edge of the matrix pair against hinge filler on top of the exposed adhesive surface of the tape, being careful not to introduce any buckle or curve in the hinge or matrix film. Slight buckling will cause air pockets in printing at a later stage. Apply second strip of hinge tape, adhesive side down, and press together firmly. See Figure 3.

Figure 3

The hinge filler is simply a strip of plastic of thickness equal to that of the whole "sandwich" of matrices and Vectograph film. It equalizes thicknesses of hinge and "sandwich" and prevents skidding of the Vectograph film as the assembly passes between printing rolls.

(3) **Remove** masking tape from other edges of matrix pair and trim these edges to match if necessary. See Figure 4.

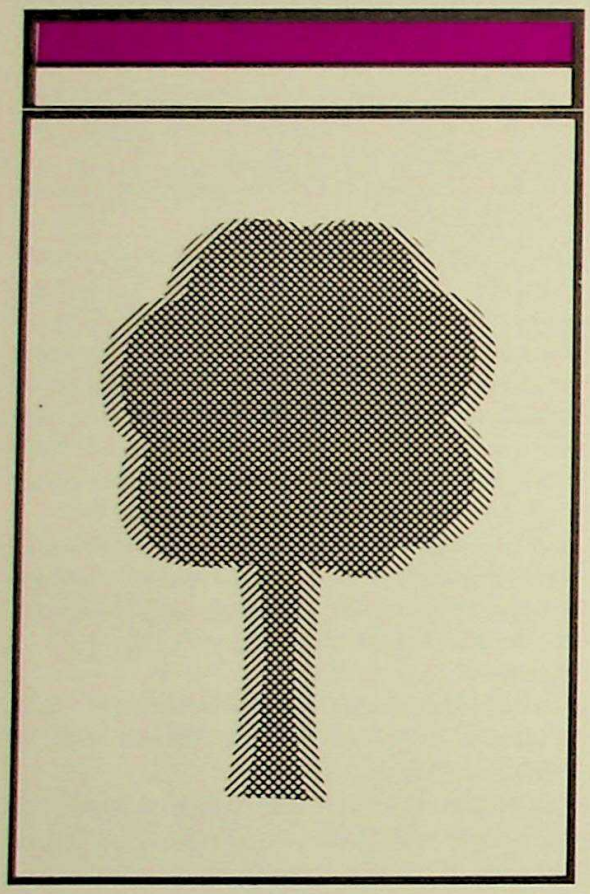


Figure 4

V. Preparation of Polaroid 3-D Vectograph Prints

Materials and procedure for making Polaroid 3-D Vectograph prints are first presented in outline form (Section A) and are then described in detail (Section B). An extra copy of the outline is included on page 11, so that it may be used for convenient reference.

A. Vectograph Print Preparation Outline

1. Solutions

Vectograph Printing Solutions

(for 1-gallon tank)

	MEDIUM (B-252)	WEAK (B-250)	(STRONG B-253)
Water	3400 ml.	3400 ml.	3400 ml.
Potassium Iodide	250 g.	250 g.	250 g.
Polaroid Vectograph Ink (AB)	200 ml.	150 ml.	250 ml.

Vectograph Fix Bath B-248 (for 8″ x 10″ tray)

Mix according to instructions on Fix Bath package

Vectograph Lacquer 676

Use Polaroid Vectograph Lacquer as received

Vectograph Aluminum Lacquer

Polaroid Aluminum Pigment 689 Polaroid Lacquer 676	Mix according to instructions on Aluminum Pigment package

2. Procedures

a. Processing

Step	Time	(All solutions used at Room Temperature) Solution
1. Soak matrices in Printing Solution	5 minutes or more	Vectograph Printing Solution: Strong B-253 Medium B-252 or Weak B-250
2. Form Vectograph Print	1 minute	
3. Fix Vectograph Print; return matrices to Printing Solution or place in wash tank	1 minute	Vectograph Fix Bath B-248
4. Squeegee and wipe Vectograph Print	1 minute	
5. Dry Vectograph Print	15 minutes or more	

b. Finishing and mounting

1. Reflection Vectograph prints — lacquer front surface; apply aluminum lacquer to back.
2. Transparencies for direct viewing — lacquer both surfaces.
3. Transparencies for projection — omit lacquering; mount between cover glasses.

B. Details of Vectograph Print Preparation

1. Materials and Solutions

a. **If panels or sheets of Vectograph film are cut to smaller sizes,** it is important not to lose identification of the surface orientation. The rule is to make the short side of the cut piece parallel to the short side of the original panel or sheet. If this is done, all instructions on left-right orientation of negative, matrix and Vectograph film will still apply.

b. **Vectograph Printing Solution is used in deep tank,** both for its preservation and for protection from airborne dust particles, which will easily become embedded in the swelled gelatin of a matrix. Printing solution should be filtered occasionally and kept covered or bottled when not in use. Vectograph print density may be controlled over a short range by adjusting composition of the printing solution. The **medium** formula given is suitable for most properly exposed matrices. If lighter prints are desired, switch to **weak** printing solution; for darker prints, use **strong** printing solution.

One gallon of Vectograph printing solution will produce approximately 100 8″ x 10″ Vectograph prints. Printing solutions can be replenished or strengthened by addition of Polaroid Vectograph Ink (AB).

c. **Vectograph Fix Bath** stabilizes the Vectograph print and also fixes its tone. The fix bath formula provided will give a slightly bluish tone with Type R-1 Vectograph film. To adjust to neutral or brown tone, add to 500 ml. of fix bath from 0.25 to 1.0 grams of potassium iodide. 500 ml. of Vectograph fix bath will process approximately 30 8″ x 10″ Vectograph prints.

d. **A pair of matrices may be used many times** to produce duplicate prints. It is not necessary to wash them between successive printings. If matrices are to be re-used within a few minutes they are simply returned to the tank of printing solution. If matrices are not to be re-used soon, rinse for 5 –10 minutes in a deep tank with circulating water and hang to dry in a dust-free place.

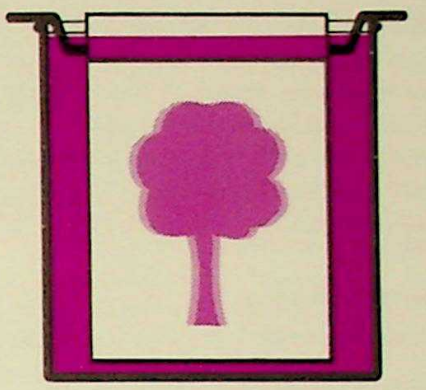
2. Vectograph Print Procedures

a. **Printing process**

The entire Vectograph printing procedure is carried out in white light, as no photosensitive materials are used.

(1) **Soak matrices in Vectograph Printing Solution** (B-250, B-252, or B-253). Hang hinged matrices over Vectograph tank rod, taking care not to scratch gelatin surfaces. Immerse in tank of Vectograph printing solution for at least 5 minutes. Agitate occasionally. Be sure that both matrices are completely immersed and separated. See Figure 5.

Figure 5



(2) **Form Vectograph Print**

Lift matrices out of printing solution by hinge top and allow to drain slightly. Set matrix hinge in "V" of wringer rolls and turn handle just enough so that rolls grip hinge. Lay matrices apart and insert end of sheet of Vectograph film into "V" of matrices. Hold Vectograph film firmly by upper edge and run "sandwich" through printing rolls. See Figure 6.

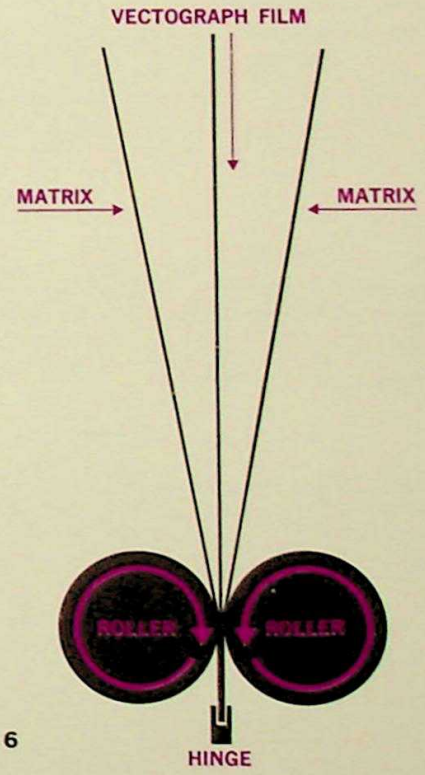


Figure 6

Allow "sandwich" to remain in contact for one minute, being careful to handle only by edges, as pressure of fingers in picture area may cause spots. At the end of this time, strip apart and either return matrices to printing solution tank or place in wash tank.

(3) **Fix Vectograph print**

Place Vectograph print in tray of fix bath and agitate continuously for 1 minute.

(4) Squeegee and wipe Vectograph print

Place fixed Vectograph print on clean, dry glass plate and squeegee to remove excess fix bath. Repeat on opposite surface, using a second dry glass plate.

Place Vectograph print on smooth, clean cloth on top of glass plate and wipe upper surface gently with second cloth until completely free of droplets. Turn over and wipe other side.

(5) Dry Vectograph print

Hang Vectograph print to dry at room temperature.

b. Finishing and mounting Vectograph prints

(1) Reflection Vectograph prints

Lay Vectograph print on clean, flat surface, with picture right side up. Apply Polaroid Vectograph Lacquer 676 to the front surface with wide camel's-hair brush, taking long, smooth strokes to cover as evenly as possible. Leave in horizontal position until dry.

Turn Vectograph print over and apply Polaroid Aluminum Lacquer to back surface with second camel's-hair brush. Allow to dry flat until lacquer has set; then hang to dry. Clean brushes with Polaroid Thinner 664.

(2) Transparencies for direct viewing

Dip Vectograph print into deep tank of Polaroid Lacquer 676 momentarily; allow to drain and hang to dry at room temperature.

Be sure that Vectograph film surface is completely dry before lacquering. Keep tank of lacquer covered when not in use. With continued use, some solvent will evaporate and lacquer should be thinned with Polaroid Thinner 664.

(3) Transparencies for projection

If transparency is to be mounted for projection, omit lacquering step. Trim to size and mount between cover glasses. Note: It is essential that the screen used in projection have a non-depolarizing surface, such as **aluminum.** Ordinary white and beaded screens scatter light and thereby destroy polarization.

Prepared by Polaroid Corporation

Cambridge 39, Massachusetts

Tear along dotted lines for extra copies of matrix and Vectograph print processing outlines, suitable for posting in darkroom.

A. Matrix Preparation Outline

1. Processing Solutions

(quantities suitable for tray development of 8″ x 10″ film)

Developer B-305	
Water	100 ml.
Kodak Tanning Developer B	100 ml.
Kodak Tanning Developer A	100 ml.
Stop Bath B-304	
Water	495 ml.
Acetic Acid, Glacial	5 ml.
or	
Acetic Acid, 28%	18 ml.
Water	480 ml.
Fix Bath B-233	
Water	500 ml.
Ammonium Thiocyanate	100 g.
Bleach B-245	
Water	400 ml.
Potassium Iodide	140 g.
Polaroid Vectograph Ink (AB)	100 ml.

2. Procedure

a. Expose

b. Process

Step	Solution	Temp. (°F)	Time
1. Presoak	Water	68°	1 min.
2. Develop	Developer B-305	68°	3 min.
3. Stop Development	Stop Bath B-304	68°	2 min.
4. Fix	Fix Bath B-233	68°	2 min.
5. Wash Off	Water (several changes)	110°	2 min.
6. Bleach	Bleach B-245	68°	2 min.
7. Rinse	Water (several changes)	68°	1 min.
8. Dry		Room Temp.	

c. Register stereoscopically and hinge.

A. Vectograph Print Preparation Outline

1. Solutions

Vectograph Printing Solutions

(for 1-gallon tank)

	MEDIUM (B-252)	WEAK (B-250)	(STRONG B-253)
Water	3400 ml.	3400 ml.	3400 ml.
Potassium Iodide	250 g.	250 g.	250 g.
Polaroid Vectograph Ink (AB)	200 ml.	150 ml.	250 ml.

Vectograph Fix Bath B-248 (for 8″ x 10″ tray)

Mix according to instructions on Fix Bath package

Vectograph Lacquer 676

Use Polaroid Vectograph Lacquer as received

Vectograph Aluminum Lacquer

Polaroid Aluminum Pigment 689	Mix according to instructions on Aluminum Pigment package
Polaroid Lacquer 676	

2. Procedures

a. Processing

Step	Time	(All solutions used at Room Temperature) Solution
1. Soak matrices in Printing Solution	5 minutes or more	Vectograph Printing Solution: Strong B-253 Medium B-252 or Weak B-250
2. Form Vectograph Print	1 minute	
3. Fix Vectograph Print; return matrices to Printing Solution or place in wash tank	1 minute	Vectograph Fix Bath B-248
4. Squeegee and wipe Vectograph Print	1 minute	
5. Dry Vectograph Print	15 minutes or more	

b. Finishing and mounting

1. Reflection Vectograph prints — lacquer front surface; apply aluminum lacquer to back.

2. Transparencies for direct viewing — lacquer both surfaces.

3. Transparencies for projection — omit lacquering; mount between cover glasses.